Education

KwaZulu-Natal Department of Education
REPUBLIC OF SOUTH AFRICA

LIFE SCIENCES

COMMON TEST

MARCH 2017

NATIONAL SENIOR CERTIFICATE

GRADE 11

MARKS: 60

TIME: 1 hour

N.B. This question paper consists of 9 pages.

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. Answer ALL the questions.
2. Write ALL the answers in the ANSWER BOOK.
3. Start the answers to EACH question at the top of a NEW page.
4. Number the answers correctly according to the numbering system used in this question paper.
5. Present your answers according to the instructions of each question.
6. Make ALL drawings in pencil and label them in blue or black ink.
7. Draw diagrams, flow charts or tables only when asked to do so.
8. The diagrams in this question paper are NOT necessarily drawn to scale.
9. Do NOT use graph paper.
10. You must use a non-programmable calculator, protractor and compass, where necessary.
11. Write neatly and legibly.

SECTION A

QUESTION 1

1.1 Various options are given as possible answers to the following questions. Choose the answer and write only the letter (A to D) next to the question number (1.1.1 to 1.1.5) in the ANSWER BOOK, for example 1.1.6 D.

1.1.1 The sea anemone is radially symmetrical because ...

A it can be cut in mirror images in one plane only.
B it can be cut in mirror images in two planes only.
C it can be cut in mirror images in any vertical plane through its central axis.
D it has an anterior and posterior end.

1.1.2 Study the list of characteristics below.

(i) Small and green
(ii) Large, red and yellow petals
(iii) Produce nectar
(iv) Have a scent
(v) Small, light, smooth and dry pollen

Which ONE of the following is characteristic of wind pollinated flowers?

A (i), (ii) and (iv) only
B (iii) and (v) only
C (i) and (v) only
D (v) only

1.1.3 Which ONE of the following plant groups has the gametophyte generation as the dominant phase?

A Angiosperms
B Bryophytes
C Gymnosperms
D Pteridophytes

1.1.4 Transfer of pollen grains from anther to stigma is known as ...

A seed dispersal.
B pollination.
C fertilisation.
D germination.

1.1.5 Which ONE of the following characteristics makes the spermatophytes more successful over other plant groups?

A Roots for anchorage
B Seeds with testa
C Leaves for photosynthesis
D Dominant sporophyte

(5 x 2) **(10)**

TOTAL SECTION A: 10

SECTION B

QUESTION 2

2.1 Read the extract below and then answer the questions that follow.

VIRUS AS MEDICINE

Genetically engineered virus can cure cancer

A study has revealed that a genetically modified form of the virus that causes the disease herpes is an effective remedy against skin cancer. The use of this virus to treat cancer (virotherapy) raises the average life expectancy of patients by 41 months as compared to other forms of therapy which increased the average life expectancy of patients by 21,5 months.

The modified herpes virus multiplies inside cancer cells until they burst open. After virotherapy, the immune system becomes capable of detecting and attacking the cancer throughout the body.

Adapted from http://rt.com/news

2.1.1 On average, how much longer (in months) did patients survive when on virotherapy as compared with other forms of therapy? (1)

2.1.2 Describe how the modified herpes virus kills the cancer cells. (2)

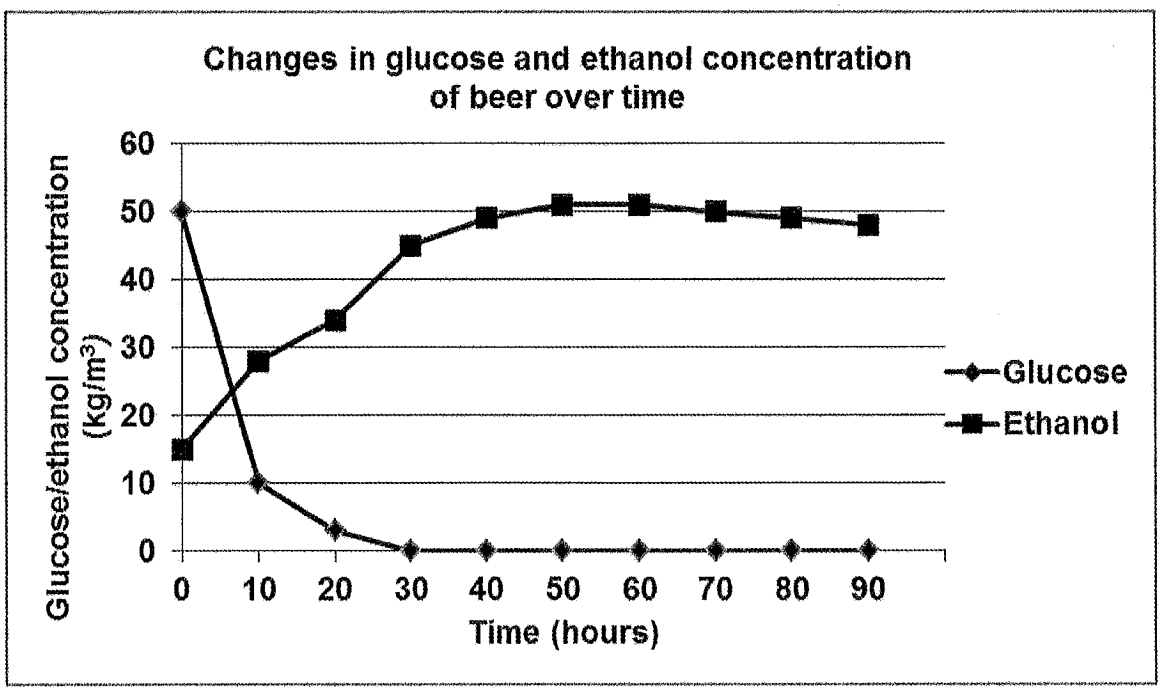
2.1.3 State the consequence of using UNMODIFIED herpes viruses for virotherapy. (1)

2.1.4 After virotherapy the immune system is able to detect the cancer cells.

Explain how the immune system responds to attack the cancer cells. (2)
(6)

2.2 A group of Grade 11 learners investigated the changes in the composition of ethanol and glucose in a liquid mixture (containing yeast cells) during the brewing of traditional beer.

The results of the investigation are represented in the graph below.



2.2.1 Identify the independent variable in this investigation (1)

2.2.2 Describe the relationship between changes in the concentration of glucose and ethanol over time. (2)

2.2.3 State ONE way in which the investigator can ensure that the investigation is reliable. (1)

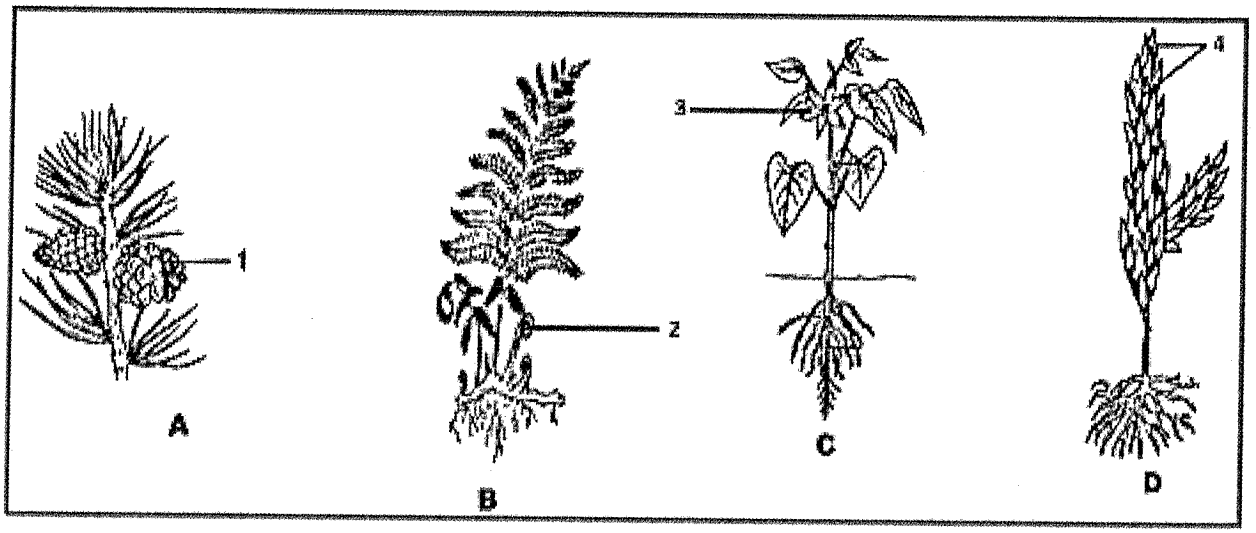
2.2.4 During which period of time was glucose used the quickest? (2)

2.2.5 Explain why the ethanol concentration remained constant between 50 to 60 hours. (2)

2.2.6 Suggest why the ethanol concentration decreased after 60 hours. (1)
(9)
[15]

QUESTION 3

3.1 The diagrams below represent four plant groups that you have studied.



3.1.1 State the LETTER only the plant group that:

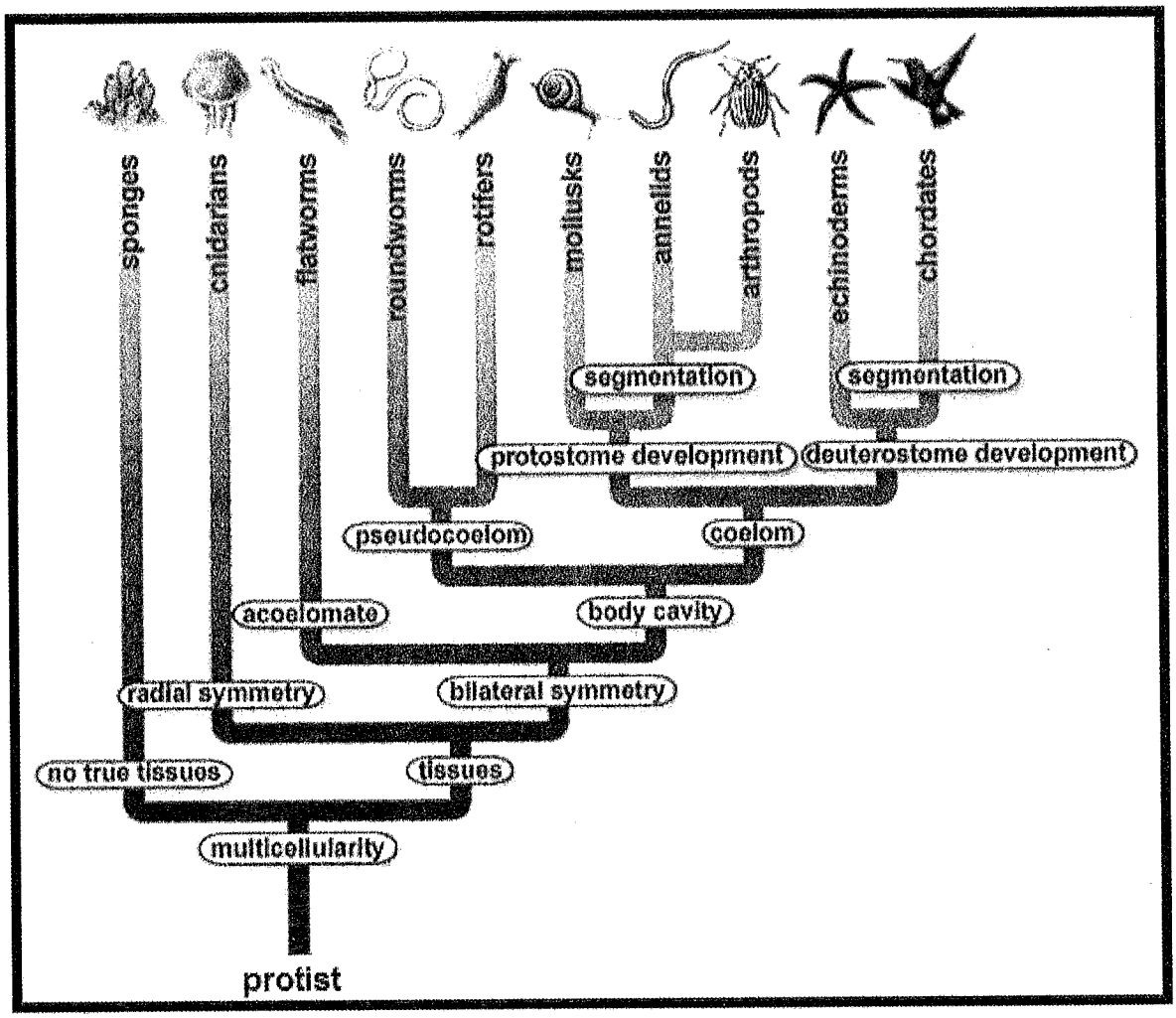
(a) Contain sori
(b) Bears fruit
(c) Have naked ovules (3)

3.1.2 Write down the number(s) only of the part(s) that represent reproductive structures. (2)

3.1.3 Explain ONE way in which the dependency on water for reproduction is reduced in **Plant C.** (2)

3.1.4 State TWO characteristics of the group represented by **Plant D** that prevent them from being as tall as the group represented by **Plant A.** (2)
(9)

3.2 The diagram below represents the phylogenetic tree of different groups of animals.



3.2.1 State the ancestor of the animal kingdom. (1)

3.2.2 Name the group of animals that is:

(a) Asymmetrical (1)

(b) Acoelomate (1)

3.2.3 Which phylum, Cnidaria or Arthropoda is more closely related to the Chordata? (1)

3.2.4 Explain your answer in QUESTION 3.2.3 (2)

(6)
[15]

TOTAL SECTION B: 30

SECTION C

QUESTION 4

Describe the role of bacteria in maintaining balance in the environment, the importance of invertebrates in agriculture and ecosystems, and the significance of seed banks.

Content:	**(17)**
Synthesis:	**(3)**
	(20)

NOTE: **NO marks will be awarded for answers in the form of flow charts, tables or diagrams.**

TOTAL SECTION C:	**20**
GRAND TOTAL:	**60**

Education

KwaZulu-Natal Department of Education
REPUBLIC OF SOUTH AFRICA

LIFE SCIENCES

MARCH 2017

MEMORANDUM

NATIONAL SENIOR CERTIFICATE

GRADE 11

MARKS: 60

This memorandum consists of 7 pages.

PRINCIPLES RELATED TO MARKING LIFE SCIENCES

1. **If more information than marks allocated is given**
   Stop marking when maximum marks is reached and put a wavy line and 'max' in the right-hand margin.

2. **If, for example, three reasons are required and five are given**
   Mark the first three irrespective of whether all or some are correct/incorrect.

3. **If whole process is given when only part of it is required**
   Read all and credit relevant part.

4. **If comparisons are asked for and descriptions are given**
   Accept if differences / similarities are clear.

5. **If tabulation is required but paragraphs are given**
   Candidates will lose marks for not tabulating.

6. **If diagrams are given with annotations when descriptions are required**
   Candidates will lose marks

7. **If flow charts are given instead of descriptions**
   Candidates will lose marks.

8. **If sequence is muddled and links do not make sense**
   Where sequence and links are correct, credit. Where sequence and links is incorrect, do not credit. If sequence and links becomes correct again, resume credit.

9. **Non-recognised abbreviations**
   Accept if first defined in answer. If not defined, do not credit the unrecognized abbreviation but credit the rest of answer if correct.

10. **Wrong numbering**
    If answer fits into the correct sequence of questions but the wrong number is given, it is acceptable.

11. **If language used changes the intended meaning**
    Do not accept.

12. **Spelling errors**
    If recognizable accept provided it does not mean something else in Life Sciences or if it is out of context.

13. **If common names given in terminology**
    Accept provided it was accepted at the National memo discussion meeting.

14. **If only letter is asked for and only name is given (and vice versa)**
No credit

15. **If units are not given in measurements**
Candidates will lose marks. Memorandum will allocate marks for units separately

16. Be sensitive to the **sense of an answer, which may be stated in a different way.**

17. **Caption**
All illustrations (diagrams, graphs, tables, etc.) must have a caption

18. **Code-switching of official languages (terms and concepts)**
A single word or two that appears in any official language other than the learners' assessment language used to the greatest extent in his/her answers should be credited, if it is correct. A marker that is proficient in the relevant official language should be consulted. This is applicable to all official languages.

SECTION A

QUESTION 1

1.1
1.1.1 C✓✓

1.1.2 C✓✓

1.1.3 B✓✓

1.1.4 B✓✓

1.1.5 B✓✓

(5 x 2) **(10)**

TOTAL SECTION A: 10

SECTION B

QUESTION 2

2.1 2.1.1 19,5✓ months (1)

2.1.2 - It multiplies inside cancer cells✓
- until they burst open.✓ (2)

2.1.3 They will cause herpes.✓ (1)

2.1.4 - The white blood corpuscles✓ will be triggered
- to produce antibodies✓ to destroy the cancer cells.
(2)
(6)

2.2

2.2.1 Time✓ (1)
As the glucose concentration decreases✓

2.2.2 - the ethanol concentration increases✓ (2)

2.2.3 - Repeat the investigation✓
- Use the average of many readings✓ Any (1)
(Mark first ONE only)

2.2.4 0 - 10✓hours✓ (2)

2.2.5 - There is no more glucose✓
- therefore no new ethanol is produced✓ (2)

2.2.6 - Some of the ethanol produced has evaporated✓ (1)
(9)
(15)

QUESTION 3

3.1

3.1.1 (a) B✓ (1)

(b) C✓ (1)

(c) A ✓ (1)

3.1.2 41✓ and 3✓ (2)

3.1.3 - Pollen grains are carried by wind or pollinating agents from one flower to another✓
- After pollination a pollen tube develop which allows male gametes to be carried directly to the egg cell✓ in the ovule (2)

3.1.4 -No cuticle✓
-No vascular/conducting tissue✓
-No strengthening tissue✓
-No true roots, stem and leaves✓/thallus Any (2)
(Mark first TWO only) **(9)**

(9)

3.2

3.2.1 Protist✓ (1)

3.2.2 (a) Sponges✓/Porifera (1)
(b) Flatworms✓/Platyhelminthes (1)

3.2.3 Arthropods✓ (1)

3.2.4

- Chordates share most of their characteristics with Arthropods✓
- than with Cnidaria✓

OR

- Arthropods and Chordates share a more recent✓
- common ancestor. ✓ (2)
(6)
(15)

TOTAL SECTION B: 30

SECTION C

QUESTION 4

Role of bacteria in maintaining balance in the environment

- Autotrophic bacteria produce their own organic food✓
- They use carbon dioxide and release oxygen during photosynthesis. ✓
- In this way oxygen and carbon dioxide balance is maintained. ✓
- Saprophytic bacteria break down dead organic matter✓
- to inorganic substances✓
- that can be recycled in the soil to make it more fertile✓
- These bacteria also release carbon dioxide and heat into the atmosphere.✓
- Nitrogen fixing bacteria can convert nitrogen gas (N_2) into nitrates✓
- which can be absorbed by plants to produce proteins.✓
- Denitrifying bacteria return nitrogen from nitrates back into the atmosphere. ✓

(Max 6)

Role of invertebrates in agriculture and ecosystem

- Invertebrates play a role in pollination✓
- assisting in plant reproduction✓.
- They help in decomposition by feeding on decaying leaves✓
- leading to the release of nutrients,✓
- making them available for re-use and re-cycle.✓

- Burrowing invertebrates result with the soil been aerated.✓
- Well-aerated soil allows more oxygen for roots and animals living in it. ✓
- Also enables water to drain through the soil more efficiently. ✓
- Invertebrates may act as secondary or intermediate hosts or vectors✓
- of pathogens that cause diseases✓
- Invertebrates are ectoparasites.✓
- Some insects are used as predators of pests✓
- in biological control.✓

(Max 7)

Significance of seed banks

- Seeds are stored in the seed banks in attempt to conserve them✓
- Endangered plants can be protected and reintroduced✓ to the environment
- Also endemic species are sustained.✓
- Indigenous plants are conserved, that might be of medicinal value.✓
- Original wild types of food and crop plant are conserved to maintain their gene type✓ in case our food supplies become threatened.✓

(Max 4)

Content: (17)

Synthesis: (3)
(20)

ASSESSING THE PRESENTATION OF ESSAY

Relevance	Logical sequence	Comprehensive
All information provided is relevant to the question	Ideas arranged in a logical sequence	Answered all aspects required by the essay
All information provided is relevant to role of bacteria, invertebrates and significance of seed banks in the environment	All the information regarding the role of bacteria, invertebrates and seed banks, is arranged in a logical manner	At least the following marks should be obtained for each of the following: - Role of bacteria in the environment **(4/6)** - role of invertebrates in agriculture and ecosystems **(5/7)** - significance of seed banks **(2/4)**
1 mark	1 mark	1 mark

20

TOTAL SECTION C:

GRAND TOTAL: 60